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SPACE CENTER Roundup

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Atlantis' crew readies space station for first inhabitants



NASA Photos STS101-717-094 and STS101-724-044

Atlantis' astronauts got the Memorial Day holiday off to a great start as they glided to a predawn landing on May 29, completing a successful 4,076,000-mile mission, the second shuttle flight of the year.

With Commander Jim Halsell and Pilot Scott "Doc" Horowitz at the controls, Atlantis landed at 1:20 a.m. CDT. It was the 14th nighttime landing in shuttle history and the 22nd consecutive mission to end with a landing at the Kennedy Space Center.

After spending Memorial Day in Florida undergoing routine medical exams, resting and celebrating the holiday with family members, Halsell, Horowitz, Flight Engineer Jeff Williams, Mission Specialists Jim Voss, Susan Helms, Mary Ellen Weber and Russian Cosmonaut Yury Usachev returned to Houston May 30. A crowd of well-wishers, including JSC Director George Abbey and U.S. Rep. Sheila Jackson Lee (D-Houston), greeted them at Ellington Field.

"What a great way to start off Memorial Day bringing this mission to a close," Abbey

told the crowd of several hundred gathered in Hangar 990. "It was a great landing and a great ending to a great flight."

"I would like to thank all of you – to thank you for your time day after day, hour after hour, minute after minute, and, yes, second after second," Jackson Lee told those in attendance.

Jackson Lee thanked the crew for completing the details necessary to prepare the International Space Station for future crews. "America needs to understand the enormous work that was done on this particular tour of duty, this particular visit, in making sure that the space station is ready for future inhabitants. Your work is most important. We thank you so very much for it."

The station's greatest benefits will come from research done aboard it in the fields of medicine and biotechnology, said Jackson Lee, who has served on the House Science Committee since becoming a member of the U.S. Congress.

"I conclude by saying to you that you make dreams a reality, which Americans will appreciate even more as they understand the value of the space station research

Left: STS-101 crewmembers, front row from left, Susan Helms, Yury Usachev, Jim Voss; back row, Mary Ellen Weber, Jim Halsell, Jeff Williams, and Scott Horowitz pose for traditional in-flight photo. Right: Jeff Williams (front) and Jim Voss work on exterior of the station during a six-hour, 44-minute space walk.

when we can bring to an end diseases like diabetes, cancer, heart disease, strokes and HIV because of the enormous work that you are doing," said Jackson Lee.

Riding aboard the upgraded and refurbished Space Shuttle Atlantis, the crew rocketed away from their Florida launch site at 5:11 a.m. CDT May 19. Flying five miles a second above the Ukraine, Halsell gently docked Atlantis at 11:31 p.m. CDT May 20, flawlessly latching his 200-ton spacecraft to the 35-ton ISS. Halsell and his crew performed the rendezvous and docking with the station by the book, docking on target.

Activities during docked operations began with a space walk by Voss and

Williams. The astronauts secured a United States-built crane that was installed on the station last year; installed the final parts of a Russian-built crane on the station; replaced a faulty antenna for one of the station's communications systems; and installed several handrails and a camera cable on the station's exterior during a six-hour, 44-minute space walk.

The space-walking activity conducted by Voss and Williams marked the fifth space walk conducted for construction of the ISS, the 49th space walk based out of the space shuttle, and the 85th space walk in history conducted by U.S. astronauts.

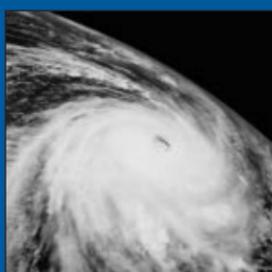
Next began improvements to the interior of the ISS. Inside the Zarya module, Helms and Usachev installed four new batteries and associated electronics. Other home improvements to the station's systems included the installation of 10 new smoke detectors and four new cooling fans in the Zarya module, additional cables for the Zarya computer to enhance its capabilities, a new communications memory unit, and a new power distribution box for the United

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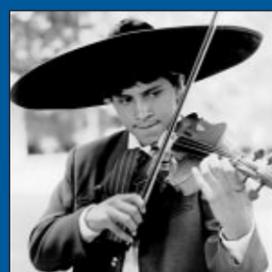
Snapshots from an ISS world traveler.

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Be prepared: it's that time of year again.

Pages 4 - 5



Team NASA celebrates diversity.

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Destination: Japan

Snapshots from an ISS world traveler

Are you the kind of person who dreams of traveling the world and is perfectly comfortable in a foreign environment? Or are you the type who prefers to be in familiar territory? It takes a certain personality type to embark on long journeys to foreign countries with confidence, especially alone.

Amie Allison, an engineer with Japan Manned Space Systems America, Inc., is such an individual. Through her previous positions in the Mission Operations Directorate, she has lived and worked in Russia and Japan.

In fact, Allison has just returned from a three-month-long tour in Tsukuba, Japan, city of the National Space Development Agency of Japan, where she says even from her first visit three years ago, she was drawn to the culture.

"I fell in love with Japan while working on the crew procedures for the Manipulator Flight Demonstrator experiment for STS-85," said Allison, who said she also got a taste of their long work hours during that project. "At that time, I was working very closely with Japanese engineers and they were so interesting and dedicated. I knew at that point I'd like to work there again."

To that end, Allison joined JAMSS America, Inc., an American subsidiary of the prime operations contractor to NASDA for the Japanese Experiment Module, also called "Kibo." There she could use her operations experience from Shuttle Payload Operations and the Houston Support Group in Moscow to support the JEM Flight Control Team.

During her stay, Allison lived in a one-bedroom apartment in Tsukuba, a modern suburb one and a half hours northeast of Tokyo. Her apartment would be considered small by U.S. standards but, Allison says, in Japan it was regarded as a fairly spacious setup for one person. Her refrigerator, only waist high, was larger than many. Slippers lined up in the apartment

entranceway, were a subtle hint that this American visitor adheres to the local customs.

Her apartment had a polished wood floor, not tatami – the traditional woven straw common in Japan – and a bed, as compared to a futon frequently used.



Amie Allison, shown here in the hurried maze of a crowded Tokyo subway station, enjoys acclimating to foreign cultures as part of her International Space Station travels.

Although she was given the option of a rental car, Allison opted to travel via bicycle, bus, and train, the popular methods of travel among Japanese. Every day she biked her way to the nearby Tsukuba Space Center. The first few weeks at near-freezing temperatures made for less than desirable bike riding conditions, even snowing one day. But in April, the cherry blossoms flowered and their white, fluffy blooms created a soft, pastel canopy over the bike path.

"The cherry blossom season in early April is a huge event for the Japanese and Tsukuba is one of the most beautiful areas to see them," explained Allison.

At work, Allison worked on a laptop next to her Japanese counterparts in a large, open office located just next to the Mission Control Room. She assisted the flight control team with JEM procedures, operations controls to safety hazards, and JEM reference material to support the

a Sumo match or Kabuki, to the shoreline beaches or to the Hakone region to steal a glimpse of the famed, yet elusive Mount Fuji. On one trip she even joined a group of coworkers for a ski trip to Zao in the northern mountainous region.

"The people are very courteous in Japan, so one thing I really noticed on the slopes is that they stop, mid-slope, to wait for each other," said Allison. "I know this because I was the slowest person in my group!"

One of the highlights of Allison's trip was a cherry blossom viewing party, common during that season. Nearly 30 of her coworkers from the STS-85 MFD project boarded a "yakatabune" boat, which cruised up and down the Sumida River in Tokyo for three hours. Cherry blossom trees laced with pink Japanese lanterns lined the river embankment for miles. Inside the boat, sitting Indian style on a tatami floor, the group celebrated the reunion and feasted on a traditional Japanese dinner complete with tofu, sashimi, saké and miso soup. The boat filled with laughter and reveling once Allison and her American friends, dressed in springtime Kimonos, kicked off the Karaoke. They soon discovered the Japanese are Karaoke experts.

Allison is now back in the states, already preparing for another trip to Japan in the fall. In her words, she says the experience in Japan is adventurous and challenging because there is no support group there for Americans whereas in Russia, NASA has an organized team to assist space program travelers acclimate to the culture. But, she says, her new Japanese coworkers have become her friends and she's eager to see them again.

For now, Allison plans to get her fill of Americana until her next rotation back to Japan – "What I missed most while living in Japan was American breakfasts, Texas' wide open spaces, Houston sunshine, and my car!" ■

NASDA ramps up its JEM flight control team, facility

One of the key responsibilities for the International Space Station's 16 International Partners is to ensure the safety of their own hardware before launch as well as in orbit. For many of the IPs, especially those providing large contributions or modules to the ISS, that means developing their own system to monitor and control their hardware.

To this end, the National Space Development Agency (NASDA), which is delivering the Japanese Experiment Module "Kibo" (meaning hope), is in the midst of developing its own mission support system complete with a Mission Control Room and a 40-person flight control team.

In itself, this may not appear to be a large feat, but for a country whose primary space endeavors until this point have focused on satellite launch and operations, the transition to a multinational, human space program is exciting and challenging.

"NASDA has never had such an integrated team for operations," explained Masazumi Miyake, senior engineer for the Space Station Mission Operations Department, NASDA. "It's a little bit easier this way. We are now implementing a similar process as NASA."

For Japan's numerous satellite missions, the agency's control team did not

include technical specialists. If there was an anomaly during a mission, it was documented and forwarded to manufacturing contractors for later investigation. Because it was satellite operations, the timeline for responses was more relaxed. For the ISS, however, NASDA needed to re-evaluate its process and system for information gathering and decision making.

"If we have a malfunction, we need to have the technical information immediately," said Miyake. "NASA developed a database to manage the information, and we are considering the same solution. Because of the manpower restrictions, we've also adopted a more compact operations team and a more integrated management style."

To become familiar with NASA's approach and mission operations support, Miyake and nine other NASDA employees

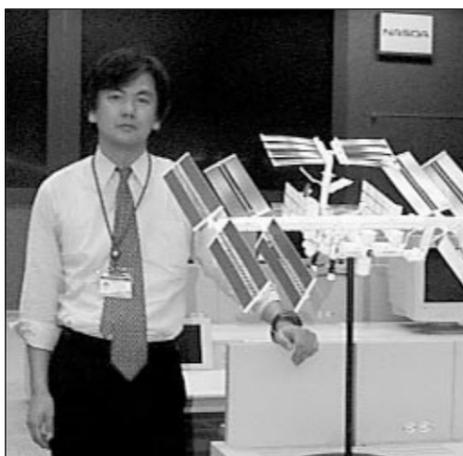
have trained in JSC's Mission Operations Directorate for six months each during the last two years.

"A number of their flight controllers supported the STS-85 MFD mission, so they now have some familiarity with human space flight operations," said

Bryan Austin, NASA flight director. "And other controllers supported their unmanned launch operations, but all-in-all they are new to this level of involvement.

"We plan to participate with them in some of their early simulations and already have had four of their flight director candidates

rotate through our Flight Director Office. This has already paid dividends since these NASDA flight controllers and flight directors can now better guide the initial development of their flight control team," added Austin.



Masazumi Miyake

Photos by Nicole Cloutier

NASDA is putting its final touches on its new Mission Control Room, which will be the hub for 24-hour JEM operations. It is located in the Space Station Operations Facility at Tsukuba Space Center, about an hour and a half north of Tokyo. The MCR will be supported by a User Operations Area where payload customers can control and monitor experiments, an Operations Planning Room, and an Operations Rehearsal Room which will be used for operator training and integrated simulations.

To further prepare, the teams meet at least twice yearly for a Joint Operations Panel meeting where both NASA MOD and NASDA controllers are represented to resolve technical operations issues.

"I learned it takes many skills to be an effective flight director," said Miyake. "For the actual operations, we won't be able to see the faces and expressions of the people we are working with who are on the loop yet out of the country. So having met them before is extremely valuable. Communications is very important, and it's more than just the language – it's the personal relationship and rapport built with your counterparts in different countries." ■

C O M M U N I T Y N E W S

NASA JSC Photo 2000-04268

Chili Cookoff

More than 65 JSC organization-sponsored teams participated in the 22nd JSC FOD Chili Cookoff. JSC Director George Abbey started the cookoff more than 20 years ago when he was director of Flight Operations. The tradition has continued through the years and now is a highlight of the spring season at JSC.

For those who want to get started on next year's recipes early, the 2001 cookoff has already been scheduled – mark your calendars for May 5, 2001. ■

An anxious crowd awaits announcement of winners for the 22nd JSC FOD Chili Cookoff. Right, members of the *Space Cadet Cookers* chili team clutch their trophy for Best Chili. Below, the *Red Baron* cooking team won the People's Choice Award.



NASA JSC Photo 2000-04271

Winners of the 2000 cookoff**Best Chili Award**

- | | |
|--------------|--|
| First Place | <i>Space Cadet Cookers</i> |
| Second Place | <i>Wrong Stuff Chili</i> |
| Third Place | <i>Dr. Bob's Cosmic Cowboy Cookers</i> |
| Fourth Place | <i>Vacuum Pump</i> |
| Fifth Place | <i>Catalytic Chili Peppers</i> |
| Sixth Place | <i>Where's the Booth?</i> |

People's Choice Award

Red Baron

Showmanship

- | | |
|--------------|----------------------------------|
| First Place | <i>Space Shuttle Chili Blues</i> |
| Second Place | <i>Grease Chili</i> |
| Third | <i>Surfin' Chili</i> |



NASA JSC Photo 2000-04270

NASA JSC Photos by Bill Stafford

JSC observes Asian Pacific American Month

A variety of Polynesian performers gathered on May 18 in the Bldg. 3 cafeteria to celebrate Asian Pacific American Month.

Singers, musicians, and dancers representing the cultures of the islands of the South Pacific performed music and dance from Hawaii and Tahiti among other islands in the Polynesian Triangle.

Some of the performers are employees at JSC or have been employed at JSC in the past. Many come from a rich

musical background developed while growing up through attendance at Hawaii's

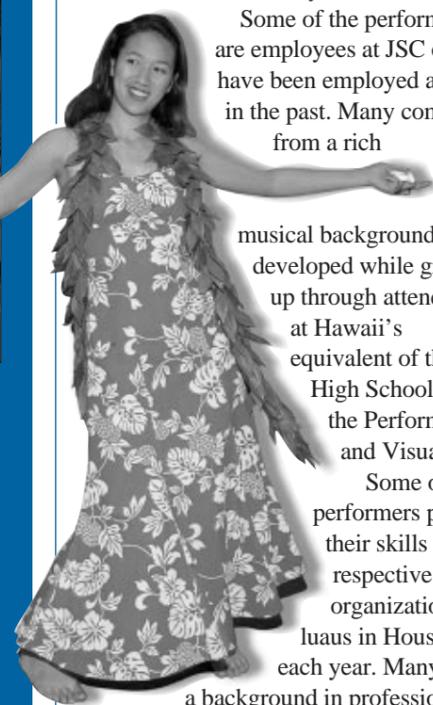
equivalent of the High School for the Performing and Visual Arts.

Some of the performers present their skills at their respective organization's

luaus in Houston each year. Many have

a background in professional performance groups for hire. Many of these singers and dancers currently perform or have performed in the Houston area to teach the culture of the islands to our city's residents.

The performers gave those in attendance a flavor of the rich culture of the islands of the South Pacific in commemoration of Asian Pacific American Month. ■

**Home Safety Fair shows the good, the bad, the ugly**

By Mary Peterson

The event was information-packed – much of it practical, everyday things we need to know, and some of it, dark reminders of the evils that exist in our lives. Throngs of JSC employees crowded the Gilruth Center and environs to beef up their knowledge on how to keep themselves and their families a little safer and a little healthier in a world fraught with risk.

The occasion was the "Safety Begins at Home" spring fair, and according to the producer-organizer extraordinaire, Muñiz Engineering's Rindy Carmichael, "This was easily our most successful fair ever, thanks in large part to the sponsoring companies who came up with some really fantastic booth displays along with the enthusiasm to match."

You had only to cruise through to know this was true. The line formed early at the child car seat check where technicians lent their expertise to a total of 92 car seats, finding 21 (approximately 23 percent) that were either recalled or defective. Helen Harris, the event's point-of-contact, said, "Only 9 of the 92, or less than 10 percent, were acceptable and installed correctly. Ironically, that's about the national average." Not good. If ever there were a wake-up call to parents, that should be it.

Meanwhile, inside Gilruth, fairgoers were queuing up to take advantage of the JSC clinic's state-of-the-art teledermatology screenings for skin cancer in hopes of not being caught unaware. If you missed your chance, you can still make an appointment at the clinic for a screening.

One of the more dramatic booths, hosted by Omnisc and manned by JSC Security Officers David Williams and Russ Tucker, featured a startling display of drugs, drug paraphernalia, and gang weapons, all confiscated within the past year by the Montgomery County

Constable's office, of which Williams is a part-time employee. The lethally sharpened letter opener, skull-shaped drug pipe, roach clips, and even the innocent-looking devices disguised as seashells and Coke cans were graphic reminders that the threats to our children are very real.

Even more disturbing was the story related by Tucker, who showed a pretty sticker, not unlike something your third grader would have among her treasures. Only this sticker was laced with LSD.

"There have been cases," Tucker said, "where parents have picked up such

stickers out of idle curiosity, and the moisture from their fingers has been enough to trigger absorption of the drug. Soon after, the parent begins 'freaking out' and has no idea why. A trip to the hospital emergency room then verifies the presence of LSD."

Even teachers have been unwitting victims. Students

have been known, for example, to place a drug-laced sticker beneath a teacher's water glass, and when the glass is picked up for removal of the sticker, bingo! It's trip time.

Another well-attended booth warning of the need to protect our children was the Laura Smithers Foundation, where, in addition to literature, Operation Kid-safe fingerprint kits were handed out with places for prints, a hair lock, identifying characteristics and marks, and a DNA sample – important to have, just in case.

On the lighter side, Armand Bayou handlers gave witty and useful information on coexisting with some of our local critters, charming onlookers with a sometimes sleepy baby alligator, assorted snakes, and for the non-arachnophobic, a chance to pet a live tarantula, hairy legs and all.

In addition to the wellspring of safety and health information, fairgoers were treated to free hot dogs, courtesy Star Toyota, and popcorn. The newest SR&QA mascot, "Safety Man," drew names for a variety of door prizes that were still another way to take safety home.

Attendance was estimated at more than 2,000, a number sure to be beaten next year if interest and positive response are indicators. ■



NASA JSC Photo 2000e15242 by James Blair

Dwight Peake, M.D., gives Marie Robinette a skin cancer screening.

Riding Out the Storm

Raising hurricane awareness

Already into another hurricane season, which began June 1 and lasts until November 1, the center has once again reviewed and updated plans for responding to hurricanes.

Every year the Hurricane Rideout Team participates in a drill called "Hurricane Polly." This drill takes the team through the actual progression of a storm development, movement, and predicted landfall. The simulation is very accurate as to the data presented and what threats a real hurricane may pose. The simulation progressively provides data to the HRT, and the HRT makes decisions based on the data presented. After the simulation, the HRT evaluates the decisions and develops lessons learned as well as implementing any needed changes to the hurricane plan.

Bill Roeh, HRT captain, states, "The 'Hurricane Polly' exercise provides us with the opportunity to make decisions as if they were real time and understand the consequences of those decisions. 'Hurricane Polly' has taught us that we have to make decisions on implementing the different levels of the JSC Hurricane Plan as early as possible."

One rule of thumb that the National Weather Service suggests using for hurricane response is to plan for one

category of storm higher than expected and plan 12 hours sooner than expected. While today's predicting and evaluation methods have proved to be fairly accurate, hurricanes can still be unpredictable in their path and destructibility. A prime example of this was Hurricane Bret, which last year formed off the western part of the Yucatan and was predicted to make landfall in the mid-coast of Mexico. Bret did not cooperate with the predictors, headed north, and became a Category 4 storm. Landfall was finally below Corpus Christi, fortunately missing highly populated areas.

During hurricane season, all organizations across the center should review their state of readiness. It is much easier to keep laydown areas orderly and neat rather than having to scramble at the last minute to secure everything. If a storm enters the Gulf of Mexico and is a threat to JSC, the center will initiate Level 4 preparations within 72 hours of predicted 59 mph winds at JSC. Level 4 preparations are basic activities that begin securing the site. If there is a high probability that a storm will pose a threat to JSC within 48 hours, Level 3 activities will be initiated by the director of Center Operations. Level 3 activities prepare JSC to be able to close down in a timely manner. When a storm threatens

JSC within 36 hours, the center will move to Level 2. Level 2 places the center in the final state of preparation. Many systems will be deactivated. The center director makes the decision when to release all employees. Level 1 activities are initiated by the center director when an imminent threat to the center exists within 24 hours. The center will likely be closed before Level 1.

"One lesson learned from past experience is to do as much as possible during daylight hours. Therefore, the HRT may recommend going to a certain level before the times that are called for in the plan," said Roeh.

The timelines for the different levels of activity have been coordinated to allow all employees to have adequate time to initiate their preparation and evacuation. Safety of the employees is the highest concern. There are more than 800,000 people who may have to evacuate the coastal areas around Galveston County in the event of a major storm. To ensure that you have the ability to evacuate, you should plan to leave the area as soon as possible. For example, if you live in League City, you will want to evacuate before Galveston is given orders to evacuate. Plan your evacuation route ahead of time.

While strong winds and heavy rains can pose a threat to human life and property, the most dangerous element of a hurricane is the storm surge. Tides of 3 feet to 10 feet are common for even moderate storms. Add to that the wind-driven waves and a significantly higher surge is attained. On September 11, 1961, when Hurricane Carla, a Category 4 storm, slammed into land near Port Lavaca, a 22-foot storm surge resulted in flooding as far inland as 10 miles. The majority of deaths that occur during a hurricane are the result of storm surge.

Speed of movement is an important factor in storm surge. Generally, slow-moving hurricanes will provide higher surges in the bays than the coast and fast-moving storms will produce higher surges at the coast than in the bay. Don't underestimate the dangers of a hurricane storm surge.

If the threat of storm surge is not enough to convince you to evacuate, consider that force caused by wind increases to the square of the wind speed. For example, wind speeds of 120 mph are four times as strong as 60 mph winds. Try walking into a 60 mph winds. Tornadoes are also a significant threat

Please see **STORM**, Page 6

Q&A

Questions and answers about hurricanes from the JSC Spaceflight Meteorology Group

What is the difference between a tropical disturbance, a tropical depression, a tropical storm and a hurricane?

A tropical disturbance is a discrete system of organized showers and thunderstorms that originates in the tropics and maintains its identity for 24 hours or more.

A tropical depression is an organized system of clouds and thunderstorms with a defined counterclockwise circulation with maximum sustained winds of 38 mph or less.

A tropical storm is an organized system of strong thunderstorms with a defined circulation and maximum sustained winds of 39 to 73 mph.

A hurricane is an intense tropical weather system with a well-defined circulation and sustained winds of 74 mph or greater.

How is a hurricane formed?

Hurricanes start as a cluster of showers and thunderstorms over tropical waters. A hurricane's main sources of energy are heat and moisture. Developing hurricanes gather this energy through contact with warm ocean waters. Water temperatures of 80 degrees Fahrenheit or warmer are typically needed for storm development.

Wind patterns are critical for tropical storm formation. The pattern most conducive to tropical storm formation is when low-level winds, below 5,000 feet, are converging and upper-level winds, above 25,000 feet, are light and diverging. Upper-level winds that are too strong will greatly inhibit tropical storm development, and often cause a hurricane or tropical storm to weaken.

What are the different parts of the hurricane?

The typical hurricane has two or three and sometimes more outer convective bands, also called feeder bands. These bands are comprised of cells resembling ordinary thunderstorms and can be up to 300 miles from the eye. The outer convective bands are generally 40 to 80 miles apart and come in advance of the main rain shield.

The rain shield is a solid area of rain that typically becomes heavier closer to the eye. The outer edge is well-defined and its distance from the eye varies greatly from storm to storm. Spiral bands or convective rings are regions

of active showers and thunderstorms that encircle the centers of hurricanes. They are prevalent in more intense hurricanes and curve cyclonically inward toward the center of the storm where they appear to merge to form the eye wall.

The eye wall is an organized band of thunderstorms that immediately surrounds the center or eye of a hurricane. It typically contains the fiercest winds and most intense rainfall.

The eye is a relatively calm center of the hurricane. The winds are light, and skies may be partly cloudy or even clear. The average hurricane eye diameter is a little more than 20 miles. In general, when the eye is shrinking in size, the hurricane is intensifying. After the eye's passage, the violent wind blows in the opposite direction it was before the eye moved over an area and the heavy rain returns.

What is a storm surge?

A storm surge is a large dome of water often 50 to 100 miles wide that sweeps across the coastline near where a hurricane makes landfall. Storm surges can range from four to six feet for a minimal hurricane to greater than 20 feet for the stronger ones. The stronger the hurricane and the shallower the offshore water, the higher the surge will be. This can cause severe flooding in coastal areas, especially when the storm surge coincides with normal high tides. Water weighs about 1,700 pounds per cubic yard; extended pounding by frequent waves can demolish any structures not specifically designed to withstand such forces. Along the immediate coast, storm surge is the greater

threat to life and property, even more so than the high winds.

Hurricane Camille produced a 25-foot storm surge in Mississippi. Hurricane Hugo in 1989 generated a 20-foot storm tide in South Carolina. Hurricane Andrew in 1992 caused a 17-foot storm surge in southeast Florida.

Note, the elevation of JSC ranges from 15 to 23 feet, so a 20 foot storm surge could put the lowest elevations at JSC under five feet of water.

How much rainfall and flooding can a hurricane produce?

Hurricanes, tropical storms, and tropical depressions are capable of producing abundant amounts of flood-producing rainfall. During landfall, a hurricane rainfall of 6 to 12

inches is common. If the storm is large and moving slowly, greater amounts of rainfall can be expected. To estimate the potential rainfall amount (in inches), divide the storm's forward motion into 100. For example, a storm moving five miles per hour could produce 20 inches of rain.

What kind of damage can happen from the wind of a hurricane?

As winds increase, pressure against objects is added at a disproportionate rate. Pressure force against a wall increases with the square of wind speed; a threefold increase in windspeed gives a ninefold increase in pressure. A 25 mph wind causes about 1.6 pounds of pressure per square foot, and places 50 pounds of force on a four by eight sheet of plywood. In 75 mph winds, that force becomes 450 pounds, and in 125 mph winds, it becomes 1,250 pounds.

WEB SITES FOR TROPICAL WEATHER

NWS National Hurricane Center
<http://www.nhc.noaa.gov>

NWS Houston / Galveston National Weather Service
<http://www.srh.noaa.gov/hgx>

FEMA and Lowes-sponsored Hurricane Central page
<http://www.storm99.com>

NWS Tallahassee Tropical Page
<http://www.nws.fsu.edu/tropical>

Dr. William Gray's Seasonal Hurricane Forecasts
<http://tropical.atmos.colostate.edu/forecasts/index.html>

University of Hawaii - Worldwide Tropical Storm Tracks
<http://www.solar.ifa.hawaii.edu/Tropical/>

National Oceanic and Atmospheric Administration (NOAA)
<http://hurricanes.noaa.gov/>

What about tornadoes?

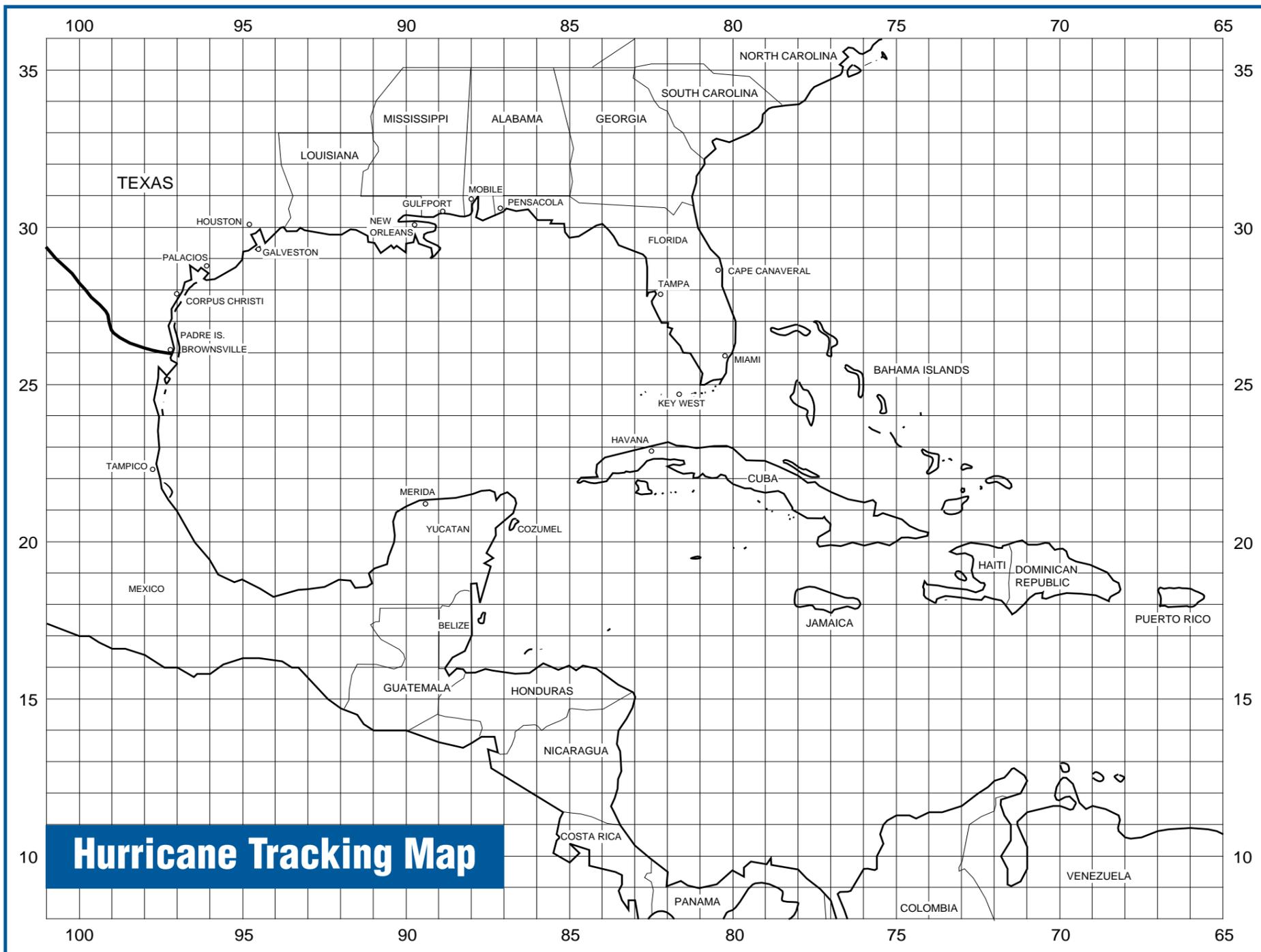
Hurricanes also produce tornadoes, which add to the hurricane's destructive power. Typically, the more intense a hurricane is, the greater the tornado threat. When a hurricane brings its winds inland, the fast-moving air hits terrain and structures, causing increased low-level wind convergence due to friction. This, in turn, enhances atmospheric lifting which increases the threat of tornadoes. The greatest concentration of tornadoes occurs in the right front quadrant of the hurricane.

Who issues hurricane watches and warnings?

Hurricane watches, warnings and advisories are officially issued by the National Weather Service's National Hurricane Center in Coral Gables, Fla. Meteorologists at NHC specialize in hurricane and tropical storm forecasting. They continually monitor atmospheric and ocean conditions, evaluate an array of atmospheric computer models and issue watches, warnings and advisories on tropical storms and hurricanes. The Houston/Galveston National Weather Service Office in League City customizes tropical storm and hurricane watches and warnings for southeast Texas. The Spaceflight Meteorology Group further customizes watches, warnings and advisories for JSC management and emergency planning managers.

How accurate are hurricane forecasts?

The National Weather Service's National Hurricane Center in Miami, Fla., prepares the official hurricane watches, warnings and advisories for the U. S. and adjacent ocean areas. Major advances have been made in hurricane forecast accuracy during the past 25 years due to improved satellite imagery and more sophisticated computer models. The average 72-hour forecast position error is about 300 miles, and the average 24-hour forecast position error is about 100 miles. This distance can mean the difference between destructive winds and storm surges and merely "tropical storm" conditions. Hurricane intensity changes are quite difficult to predict and the best plan is to expect the worst. A good rule of thumb is to plan for a storm arriving one category stronger and 12 hours sooner than predicted. ■



Emergency Supply Kit

- Flashlight
- Tissues
- Radio
- Pocket Knife
- Sanitary Supplies
- Toothbrush
- Soap
- Shampoo
- Sponge
- Cleanser
- Bleach
- Batteries
- Pencils
- Drinks/Juices
- Nuts
- Rice – Pasta
- Soups
- Canned Foods
- Water
(1 gal per person per day)



30-gallon trash barrel

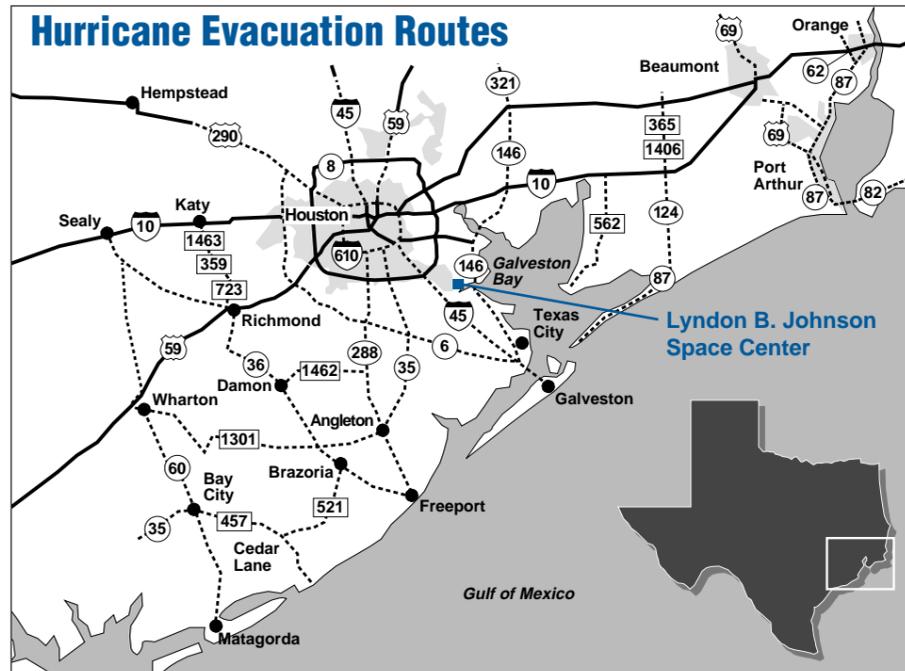
- First-Aid Kit
- Medicines
- Rubbing Alcohol
- First-Aid Handbook
- Towels
- Blankets
- Paper Towels
- Toilet Paper
- Candles
- Matches
- Can Opener
- Peanut Butter
- Crackers
- Dried Beans
- Change of Clothing
- Foul Weather Gear
- Sterno, Stove, Fuel
- Garbage Bags
- Cooking Utensils
- Cooking Pot
- Plastic Dishes
- Silverware
- Aluminum Foil

Emergency Numbers

- JSC Emergency Information Line . . . x33351
(toll free) 1-877-283-1947
- JSC Employee News Service x36765
- Emergency 911
- Harris County Flood Control
(river levels) 713-881-3100
- National Weather Service . . . 281-337-7895
- Texas Highway Department
(road closures) 1-800-452-9292
- Emergency Management Offices**
- American Red Cross 713-526-8300
- Galveston County 409-763-5971
- Pasadena 713-943-7000
- Clear Lake Office 281-282-6039
- Baytown 1-281-420-6556
- Clear Lake Shores 281-334-1034
- Deer Park 281-478-7298
- Dickinson 281-337-2489 x261

- El Lago 281-326-1951
- Friendswood 281-996-3335
- Galveston (city) 409-766-2102
- Galveston County (north) . 281-534-2531 x102
- Galveston County (south) . 409-762-8621 x102
- Harris County 713-881-3100
- Hitchcock 409-986-5559
- Houston (city) 713-881-3045
- LaMarque 409-938-9269
- League City 281-338-4836
- Nassau Bay 281-333-4200
- Pasadena 281-475-5588
- Santa Fe 409-925-2000
- Seabrook 281-291-5610
- Taylor Lake Village 281-326-2843
- Texas City 409-643-5707
- Webster 281-333-2712

Hurricane Evacuation Routes



CLIP AND SAVE—Keep this handy reference in daily planners by cutting the page on the dotted line, placing holes on the left side of the pages, and folding once. By keeping these references close at hand, you should be able to minimize the effects of a storm to your office and personal property.

Hurricane Preparation To Do List

Before leaving the office:

- ✓ Unplug computers and wrap in plastic bags.
- ✓ Unplug all electrical equipment.
- ✓ Close all doors.
- ✓ Move unique or valuable papers to inside rooms.
- ✓ Secure all classified material, lock all security files, safes and cabinets.
- ✓ Remove bottom file drawers and place on a desk or table, if file cabinets are located on the first floor.
- ✓ Raise venetian blinds to near the top of the window.

Things to do at home:

- ✓ Check your portable radio and battery-operated lights and flashlights.
- ✓ Monitor weather broadcasts for current conditions and advisories from local emergency management officials.
- ✓ Restock food supplies every six months.
- ✓ If evacuating, be sure to post a prominent note with evacuation details.
- ✓ Take pets and their supplies with you when evacuating.

NOTE: This list is not intended to be all-inclusive. Employees must decide what supplies are best suited for their family's survival. This list contains only suggestions for consideration.

Ripped from the ROUNDUP

Ripped straight from the pages of old Space News Roundups, here's what happened at JSC on this date:

1 9 7 0

The Congressional Medal of Honor Society of the United States honored NASA recently for "making America first in space."

Dr. Thomas O. Paine, NASA Administrator, accepted a plaque on behalf of NASA and kindred organizations, which have played a part in "placing America first in the space program."

The presentation was made by Dr. Eli Whitely, president of the CMHS, which is made up of recipients of the nation's highest award for valor, the Medal of Honor.

1 9 8 5

The space shuttle's nose wheel steering capability, used only on an experimental basis thus far in the program, is expected to be upgraded to fully operational status by this fall.

Until that capability becomes operational on the vehicles in the shuttle fleet, NASA intends to choose between the Kennedy Space Center and Edwards AFB as the primary end-of-mission landing site on a flight-by-flight basis.

The use of nose wheel steering, NASA said, would allow the shuttle pilots to use the brake system for stopping Orbiters, rather than for braking and steering combined.

1 9 9 0

NASA will return to the satellite rescue business on the Space Shuttle *Endeavour's* maiden voyage, attaching a new booster to the stranded Intelsat.

The plan for the mission, baselined as STS-51 in February 1992, calls for *Endeavour's* crew to rendezvous with the satellite, attach a new booster and re-deploy the spacecraft and boost it so that it can complete its trip to geostationary orbit 22,300 miles above the Earth.

The rescue scenario has *Endeavour* carrying a 20,000-pound booster motor in a cradle up to Intelsat. Using the robot arm, the as yet unnamed crew will bring the satellite into the orbiter's payload bay where space-walking crewmembers will attach the satellite to its new booster.

NASA flight surgeon receives Ward Memorial Award

Dr. Jeffrey A. Jones was awarded the Julian E. Ward Memorial Award at the 71st Annual Scientific Meeting of the Aerospace Medical Association held May 14-18, 2000, in Houston, due to his outstanding performance during his NASA/University of Texas Medical Branch residency. As a result, he stepped from resident to NASA flight surgeon in seamless fashion. His specific expertise in radiation has been recognized, and is proving to be vital as NASA plans exploratory class missions.

Dr. Jones earned a bachelor of arts degree in biology and psychology from Trinity University, San Antonio, in 1981; a medical degree from Baylor College of Medicine in 1984; and a master of science degree in preventive medicine and community health from University of Texas Medical

Branch in 1981. He graduated with high honors from the USAF Aerospace Primary Course at Brooks Air Force Base, Texas, in 1996, and completed Hyperbarics Medicine Training for Health Care Officers in 1997.

In 1997, he co-chaired a session on biomedical issues for a Mars mission at the 12th Man in Space Symposium and presented a paper at the International Conference on Life Support and Biosphere Science Meeting.

In 1998, he organized a plenary panel on Life Sciences Issues in Mars Exploration and spoke on surface operations during the founding

convention of the Mars Society, and was an invited speaker on Shuttle Emergency Medical Response at Brooke Army Medical and on military aviation medicine at the Pushing the Envelope III Symposium.



Jeffrey Jones

He wrote and presented two original papers at the Aerospace Medical Association Annual Meeting in 1998 – one on neck injuries in high-performance aircraft pilots and the other on reducing bioeffects of space radiation.

Currently, Dr. Jones is flight surgeon and acting operational radiation biologist for Medical Operations, Medical Sciences, at the Johnson Space Center. His duties include: co-chair of the Multilateral Medical Operations Panel Countermeasures and Monitoring Working Group, flight surgeon representative to the Multilateral Medical Operations Panel Radiation Health Working Group, International Space Station flight surgeon, and flight surgeon for both the Crew Return Vehicle Design Project (X-38) and the Human Exploration and Development of Space Project (Mars Exploration Medical Team, Advanced Medical Technologies). He is a member of the NASA/JSC Institutional Review Board and Tiger Team member for development of the International Space Station urinary monitoring system and improved collection interface device. ■

Continued from Page 1

ATLANTIS

States-built backup communications system. All of the new internal and external equipment has been checked out and is in excellent condition.

The crew unloaded more than 3,000 pounds of gear from *Atlantis* during the six-day linkup with the ISS. Subtracting equipment removed from the station and stowed aboard *Atlantis*, the net change in mass for the station is about one additional ton. Along with the new electrical equipment installed, the crew also stowed supplies for future crews aboard the ISS including 46 gallons of water in four bags, a treadmill, an exercise bicycle

ergometer, and a resistive exercise device as well as sewing kits, trash bags, clothes, tools and a small-scale model of the ISS, among other items.

Also, Halsell and Horowitz gave the ISS a boost. Using the steering jets in gentle, hour-long maneuvers over the course of three consecutive days, they raised the station's orbital altitude by 27 miles. The station is now in the optimum orbit to await the arrival of the next major station component – the Russian Service Module, which will serve as the crew's living quarters.

Atlantis undocked from the orbiting ISS outpost at 6:03 p.m. CDT on May 26, as the two spacecraft flew more than 230 miles above Kazakhstan in Central Asia.

Left in orbit is the renovated ISS, which station flight controllers report is functioning in excellent condition. The station is orbiting at an altitude of about 238 statute miles, awaiting arrival of the Russian "Zvezda" Service Module. It is scheduled for a mid-July launch on a modified Proton rocket from the Baikonur Cosmodrome in Kazakhstan. The ISS will automatically rendezvous and dock with "Zvezda" about two weeks after the new module is placed in orbit.

Atlantis is being processed for the next shuttle flight, STS-106, in early September to return to the ISS with another crew for the outfitting and supply of the newly arrived Service Module. ■

Continued from Page 4

STORM

from hurricanes, most likely forming in the right front quadrant.

"Every year, we, the members of the HRT, are exposed to more information on the behavior and destructibility of hurricanes," said Roeh, "and each year I am more convinced that advanced planning not only by organizations but by individuals is needed to survive this threat safely. The potential catastrophic effect

The center has a plan.

Do you?



of a Category 4 or 5 storm in this area is almost beyond comprehension. Harris County predicts damage in the range

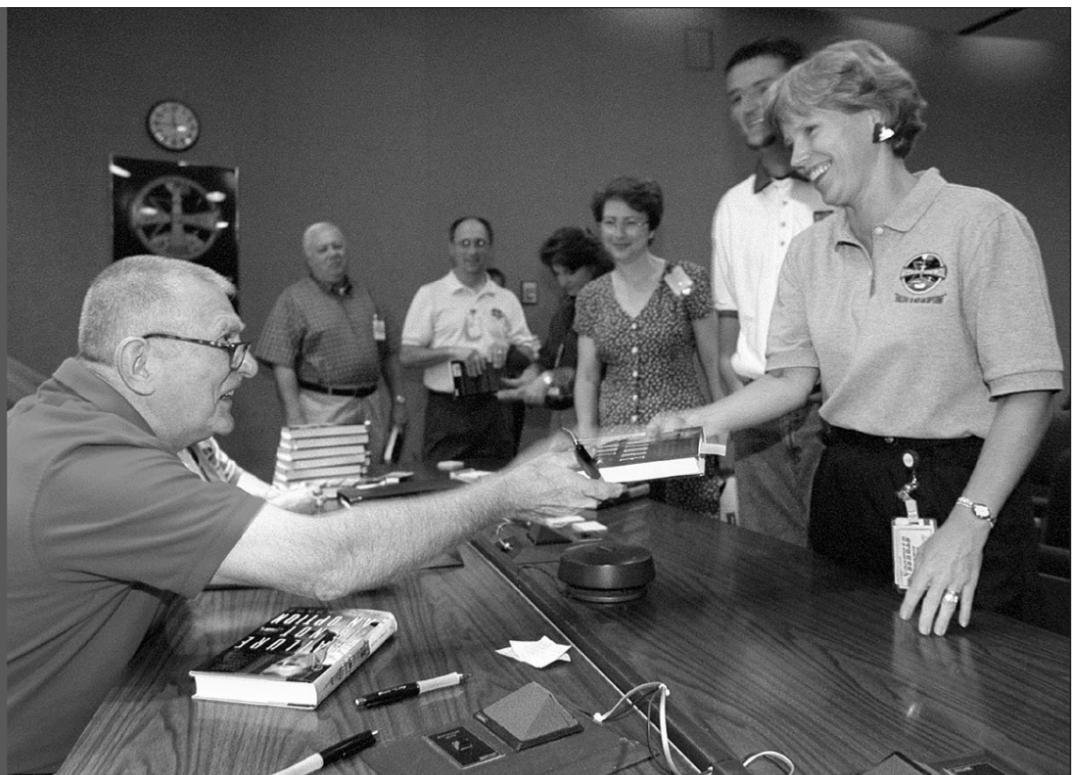
of \$18 billion to \$30 billion should it receive a hit from a Category 4 storm."

Your safety depends on your response. If a hurricane threatens, keep listening to your local radio or television for the latest advisories and instructions from local officials. The first rule to remember is that if you are advised to evacuate, do so immediately. Evacuation is a lifesaving means of protecting yourself and your family. Be prepared. Fill your car's gas tank early. ■

All good things come to those who wait...

Hundreds of JSC employees and space enthusiasts waited their turn to have former JSC Flight Director Gene Kranz sign copies of his new book, *Failure Is Not An Option*. Shown here, Mary Wylie meets the author in Bldg. 32 auditorium.

NASA JSC Photo 2000-04593
by James Blair





American Heritage Week 2000

A glimpse of the past...visions of the future



By Eric Raub

It is time again to celebrate unity and diversity during American Heritage Week, June 26-30. The annual celebration continues the effort to include all members of "Team NASA" in the festivities including civil service employees, our aerospace partners, families and friends. The theme of American Heritage Week is, appropriately enough for "Team NASA," "A Glimpse of the Past... Visions of the Future!"

American Heritage Week was started seven years ago by the Equal Opportunity Programs Office as an effort to celebrate the uniqueness of all cultures at the same time. Rather than isolating specific groups and recognizing them individually, the event was designed to simultaneously recognize and celebrate everyone's differences and the unity they provide for "Team NASA." In this way, everyone can celebrate diversity together and become more familiar with the various groups as well as with individuals in the "Team NASA" community.

"American Heritage Week turns the spotlight on the diverse heritage of the entire team," said Equal Opportunity Programs Director Estella Hernandez Gillette, "while at the same time we celebrate the unity, partnership, and teamwork that keep the organization working and learning together for the common goal."

Everyone is welcome and encouraged to attend the daily multicultural entertainment events from 11:30 a.m. to 12:30 p.m. at the Bldg. 3 cafeteria. There is no charge for any of the wonderful opportunities to learn about and celebrate various cultures.

Scheduled to appear are: The Boyz, the Star-Spangled Brass Group, the Chorus Sine Nomine, the Ball High Ballet Folklorico, and the JSC Town Criers.

The event is hosted by JSC; however, for American Heritage Week to be a complete success, all members of "Team NASA" throughout the Clear Lake area are encouraged to attend to better learn about the diversity of the entire organization. Employees are also encouraged to bring their family members, especially for the Grand Finale, which will have plenty of food, beverages, and fun for everyone.

The daylong Grand Finale celebration on June 30 begins with a parade at 1:30 p.m. that will depart from the front of Bldg. 1 and will include decorated vehicles, horses, and riders. The entire caravan will enjoy a send-off by the Forest Brook High School Marching Band. The Clear Lake High School Honor Guard will open the ceremony at the Gilruth with the presentation of colors. Ashley Toman, 8, will sing the National Anthem during the opening ceremonies, which also will include a welcome from JSC Director George W. S. Abbey.

The entertainment continues from 3:30-7 p.m. with performances by: Clan Ceili, Conjunto Chileno de Houston; Abraham's Tree; Ashley Toman; an Egyptian Folklore group; Verstyle; and LS4. Astronauts will be present to sign autographs, and face painting will be available for children (and the young at heart). Visions of the past will be the Gilruth Ballroom with a "country fair" theme, and a glimpses of the future will be seen in the International Space Station trailers which will be available for touring. As in past years, Houston Highlanders Bagpipes will close the event. ■

Weeklong Activities

11:30 a.m. -12:30 p.m in Bldg. 3 Monday – Thursday, June 26-29

Join us in the JSC Bldg. 3 cafeteria 11:30 a.m.-12:30 p.m. for daily, multicultural performances

Grand Finale

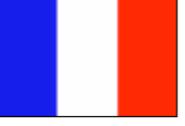
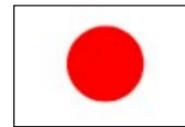
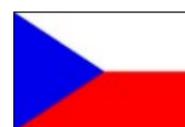
Friday, June 30, 2000

- 12:30 p.m. The Forest Brook High School Marching Band will perform behind Bldg. 1
- 1:30 p.m. Parade departs, front of Bldg. 1, travel on-site JSC
- 3:30 p.m. Grand Finale at the JSC Gilruth Center, including performers, astronaut autographs, face painters, refreshments, and a tour of the International Space Station trailers

For further information call Patricia Burke at 281-483-0606.

TEAM  NASA

You and your organization are cordially invited to participate in the annual celebration of the many heritages represented by our Team NASA workforce.



DATES & DATA**June 20**

NPMA meets: The National Property Management Association meets at 11:30 a.m. June 20 and July 18 at the Gilruth Center. For more information, contact Ray Whitaker at (281) 212-6030.

June 21

Astronomy seminar: The JSC Astronomy Seminar Club meets at noon June 21 and 28 in Bldg. 31, Rm. 248A. For details, contact Al Jackson at x35037.

Scuba club meets: The Lunarfans meet at 7:30 p.m. For more information, contact Mike Manering at x32618.

Spaceteam Toastmasters meet: The Spaceteam Toastmasters meet at 11:30 a.m. June 21 and 28 at United Space Alliance, 600 Gemini. For more information, contact Patricia Blackwell at (281) 280-6863.

June 22

Communicators meet: The Clear Lake Communicators, a Toastmasters International club, meet June 22 and 29 at 11:30 at Wyle Laboratories, 1100 Hercules, Suite 305. For more information, contact Allen Prescott at (281) 282-3281 or Richard Lehman at (281) 280-6557.

June 29

Radio Club meets: The JSC Amateur Radio Club meets at 6:30 p.m. at Piccadilly, 2465 Bay Area Blvd. For more information, contact Larry Dietrich at x39198.

July 3

NSS meets: The Clear Lake area chapter of the National Space Society meets at 6:30 p.m. at the Parker Williams Branch of the Harris Co. Library at 10851 Scarsdale Blvd. For additional information, contact Murray Clark at (281) 367-2227.

July 6

Warning System Test: The site-wide Employee Warning System performs its monthly audio test at noon. For more information, contact Bob Gaffney at x34249.

July 11

Aero Club meets: The Bay Area Aero Club meets at 7 p.m. at the Houston Gulf Airport clubhouse at 2750 FM 1266 in League City. For more information, contact Larry Hendrickson at x32050.

July 12

IAAP meets: The Clear Lake/NASA Chapter of the International Association of Administrative Professionals meets at 5:30 p.m. at Bay Oaks Country Club. Cost is \$16. For details and reservations, call Tami Barbour at (281) 488-0055, x238.

OUT&ABOUT ★

NASA JSC Photo 2000-04218 by James Blair

JSC sponsored two outreach booths at the recent Aerospace Medical Association's 71st Annual Scientific Meeting in Houston May 14 - 18. AsMA organizers reported a record attendance of more than 1,600 at the event, which featured presentations from former NASA Flight Director Eugene Kranz and JSC Director of Space and Life Sciences Dave Williams. Information on next year's conference in Reno, Nev., can be found at www.asma.org.

Shown here, left to right are George Beck, Wyle, and Mike Powell, NASA, talking in front of the NASA booth.

July 13

Airplane club meets: The Radio Control Airplane Club meets at 7 p.m. at the Clear Lake Park building. For more information, contact Bill Langdoc at x35970.

MAES meets: The Society of Mexican-American Engineers and Scientists meets at 11:30 a.m. in Bldg. 16, Rm. 111. For more information, contact George Salazar at x30162.

July 14

Astronomers meet: The JSC Astronomical Society meets at 7:30 p.m. at the Center for Advanced Space Studies, 3600 Bay Area Blvd. For details, contact Chuck Shaw at x35416.

July 19

Scuba club meets: The Lunarfans meets at 7:30 p.m. For more information, contact Mike Manering at x32618.

NASA BRIEFS**CREW NAMED FOR FUTURE SPACE STATION MISSION**

Veteran Astronaut Jim Wetherbee will command the eighth space shuttle mission to visit the International Space Station on a flight in 2001 to rotate space station crews and continue space station assembly.

Joining Wetherbee on the flight deck for STS-102 aboard *Discovery* will be Pilot James Kelly. Rounding out the crew are Mission Specialists Andy Thomas, Paul Richards, and previously assigned space station Expedition 2 crewmembers, Yury Usachev, Jim Voss and Susan Helms.

NASA TECHNOLOGY MAY REPLACE DENTIST'S DRILL

In the near future, a laser device inspired by NASA may replace the dentist's drill. Flip a switch and it will also replace the dentist's razor-sharp scalpel. Best of all, it's virtually painless and requires no anesthesia for most patients.

Lasers exist today that work on hard tissue like teeth to prepare the tooth for filling, and on soft tissue for gum treatment and oral surgery.

But none does both, and buying two laser systems is expensive. That is one reason why only 5 percent of approximately 140,000 U.S. dentists use a laser system.

Now, researchers at NASA's Langley Research Center have demonstrated that the two laser wavelengths important to dentists can be produced from a single, easy-to-use system. Both wavelengths can be produced using the same hardware, dramatically reducing cost and complexity. Dentists can switch between the two by selecting the amount and rate of energy pumped into the specially designed laser system. The resulting hardware is about one-half the size of two distinct laser systems and does not require the laser system to be "tuned" by the operator as do typical present-day systems.

A typical hard tissue laser costs about \$38,000, and a soft tissue laser costs around \$25,000. The dual wavelength unit made possible by this new technology is expected to cost less than \$30,000.

Lantis Laser, Inc., Hewitt, New Jersey, is working with NASA Langley to refine the technology to explore its potential as a commercial dental laser product. Under the terms of a Space Act Agreement, a Lantis scientist will perform research in a Langley laboratory with help from the technology's inventors. If the technology receives Food and Drug Administration approval by mid-2001, the goal is to begin sales of the device by the end of 2001.

The discovery of the two-wavelength technology is a spin-off of work to develop high-power lasers for remote sensing of the atmosphere, a key element in NASA's atmospheric sciences mission. The technology has also been used in aeronautics research including measurements of winds, wind shear and turbulence in flight and measurement of wake vortices from the ground in airport terminal areas. Those investigations led to the discovery that it is possible to selectively produce two or more useful wavelengths from a single laser source.

TICKET WINDOW**The following discount tickets are available at the Exchange Stores**

General Cinema Theaters	\$5.50
Sony Loew's Theaters	\$5.50
AMC Theaters	\$5.00
Fiesta Texas	adult ... \$20.50 ... child (under 48 inches) ... \$17.25
Astroworld	1 day ... \$21.00 ... 2 day ... \$31.00
WaterWorld	\$12.00
Moody Gardens (2 events) (does not include Aquarium Pyramid)	\$10.75
Moody Gardens (Aquarium only)	\$9.25
Sea World	adult ... \$29.00 ... child (3-11 years) ... \$19.25
Schlitterbahn	adult ... \$21.50 ... child (3-11 years) ... \$18.00
Space Center Houston	adult ... \$11.00 ... child (age 4-11) ... \$7.25
(JSC civil service employees free.)	
Space Center Houston annual pass	\$18.75
Splash Town	1 day ... \$13.00 ... Season Pass ... \$37.50
Postage Stamps (book of 20)	\$6.60

Exchange Store hours

Monday-Friday	
Bldg. 3	7 a.m.-4 p.m.
Bldg. 11	9 a.m.-3 p.m.

- ▶ All tickets are nonrefundable.
- ▶ Metro tokens and value cards are available.

For additional information,

please call x35350.

Please bring your driver's license to pay by personal check.

SPACE CENTER Roundup

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